

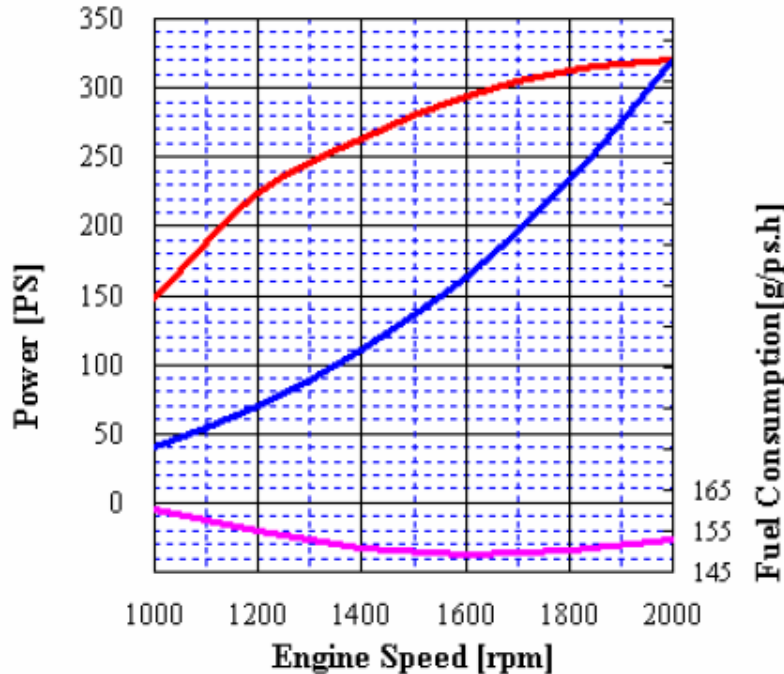
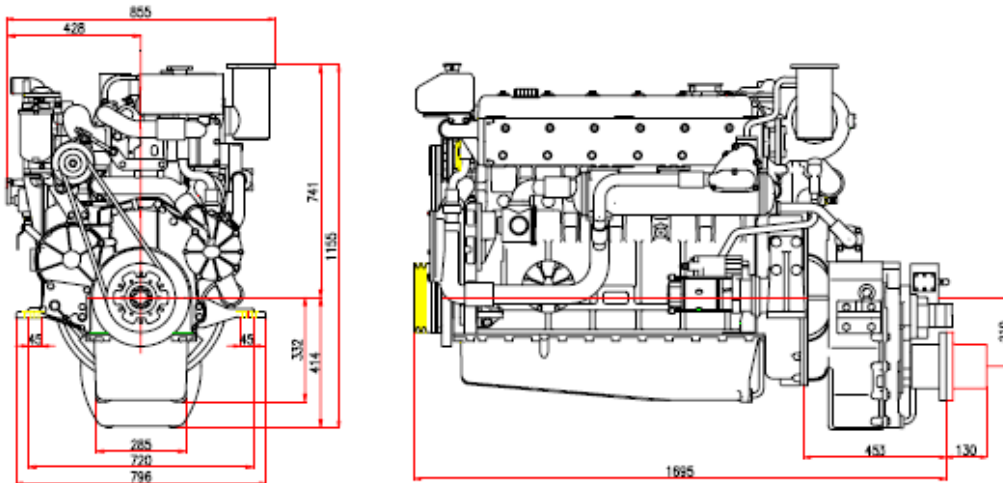
## MD196TI MARINE ENGINE

### POWER RATING

Production tolerance :  $\pm 3\%$

MODEL	CONDITIONS	POWER	rpm	Base Engine
MD196TI	HEAVY DUTY	320PS (235kW)	2,000	DE12TI

**Note :** 1) No reduction in rating for intake air temperature is up to 45 °C (318K) and sea water temperature is up to 32 °C (305K) , relative humidity is up to 60 % all data are based on operation to ISO 3046.



- **Heavy Duty :** Operation hours are unlimited per year,  
 At average load application is up to 90 %,  
 At full load application is up to 80 %  
 Typical gearbox ratio: 2.5 ~ 6  
 (Fishing trawler, Tug boat, Pushing vessel, Cargo boat, Freighter, Ferry)

Engine Specification			
Model		Units	MD196TI
Engine type			4 cycle, In line, direct- injection, water cooled with wet turbo charger & inter-cooler
Rating output (B.H.P)		PS(kW)/rpm	320(235)/2,000
Displacement		cc	11,051
Cylinder number - bore( $\phi$ ) x stroke		mm	6 - $\phi$ 123 x 155
Valve clearance at cold	In / Ex	mm	0.3 / 0.3
Low idling rpm		rpm	750+50
No load max. rpm		rpm	below 2,200
Mean effective pressure		kg/cm <sup>2</sup>	13.03
Mean piston speed		m/sec.	10.33
Compression ratio			16.5 : 1
Firing order			1 - 5 - 3 - 6 - 2 - 4
Max. firing pressure of cylinder		kg/cm <sup>2</sup>	105
Compression pressure	at 200 rpm	kg/cm <sup>2</sup>	28 ( Initial condition )
Governor type of injection pump			Mechanical variable speed (R.Q.V)
Fuel consumption		g/PS.h	158
		lit / h	61
Injection timing (B.T.D.C)		deg	16°±1°
Fuel inj. nozzle opening pressure		kg/cm <sup>2</sup>	1st : 160 , 2nd : 220
Starting system			Electric Starting by starter motor
Starter motor capacity		V- kW	24 - 6.0
Alternator capacity		V- A	24 - 50
Battery		V- Ah	24 - 150
Cooling system			Indirect sea water cooling with heat exchanger
Cooling water capacity	Max. / Min.	lit	24 / 19
Fresh water pump type			Centrifugal type, driven by gear
Sea water pump type			Rubber impeller type driven by gear
Lubricating oil (Engine)	Pan capacity	lit	Max : 25, Min : 19 ( Engine total : 27)
	Pressure	kg/cm <sup>2</sup>	Full : 3.5, Idle : 1.2
Marine gear	Model		TK450 (TaePyongYang)
	Gear ratio		1.97 2.53 3.04 3.42
Direction of revolution	Crankshaft		Counter clockwise viewed from stern side
	Propeller		Clockwise viewed from stern side
Engine size (L x W x H)	Without M/G	mm	1,242 x 854 x 1,073
	With M. gear	mm	1,695 x 854 x 1,155
Engine dry weight	Without M/G	kg	1,009
	with M. gear	kg	1,329

psi = kg/cm<sup>2</sup> x 14.22  
 lb/ft. = N.m x 0.737  
 kW = 0.2388 kcal/s

lb= kg x 2.205  
 lb/PS.h = g/kW.h x 0.00162  
 cfm = m<sup>3</sup>/min x 35.3

hp = PS x 0.98635  
 U.S gal. = liter x 0.264